# VM Coastal

1000|500|250 kHz

**The VM Coastal package is a highly versatile ADCP system that can be easily installed on a vessel of opportunity.**



The VM Coastal safeguards data quality, opens up new and unprecedented opportunities to the scientific community, and offers operational convenience and reduced complexity.

The VM Coastal package includes the Signature1000, 500 or 250, allowing for great versatility in both the vessel-mounted and bottom-mounted configurations. By using a state-of-the-art and user-friendly vessel-mounted package, measurement errors and initial installation time can be greatly reduced.

## Highlights

- Complete, coherent system built for high performance and quick deployment
- Straightforward data acquisition and processing software
- Intuitive discharge acquisition module and post-processing with Qrev data export
- Simultaneous current, depth and suspended particulate matter (SPM) information in one place (1000 / 500)
- Vertical echosounder beam for studying SPM down to the bottom (1000 / 500)
- Multifrequency option enables vertical beam operation at 1000, 500 and 250 kHz (1000)

## Applications

- Coastal surveys, up to 200 m depth
- Port and harbor modeling
- River discharge measurements
- Large-scale mixing studies

## Technical specifications

| Water velocity measurements for Signature VM 1000 kHz | |
|---|---|
| Profiling range* | 30 m |
| Cell size | 0.2–2 m |

## Water velocity measurements for Signature VM 1000 kHz

| | |
|---|---|
| Max no. cells | 256 |
| Min. blanking | 0.1 m |
| Minimum accuracy | 0.3% of the measured value ± 0.3 cm/s |
| Velocity resolution | 0.1 cm/s |
| Maximum sampling rate | 14 Hz |
| No. of beams | 4 slanted at 25 degrees |

* Maximum range depends on acoustic scattering conditions and transmit power.

## Water velocity measurements for Signature VM 500 kHz

| | |
|---|---|
| Profiling range* | 70 m |
| Cell size | 0.5–4 m |
| Max no. cells | 256 |
| Min. blanking | 0.5 m |
| Minimum accuracy | 0.3% of the measured value ± 0.3 cm/s |
| Velocity resolution | 0.1 cm/s |
| Maximum sampling rate | 6 Hz |
| No. of beams | 4 slanted at 25 degrees |

* Maximum range depends on acoustic scattering conditions and transmit power.

## Water velocity measurements for Signature VM 250 kHz

| | |
|---|---|
| Profiling range* | 150-200 m |
| Cell size | 1–8 m |
| Max no. cells | 256 |
| Min. blanking | 0.5 m |
| Minimum accuracy | 1% of the measured value ± 0.5 cm/s |
| Velocity resolution | 0.1 cm/s |
| Maximum sampling rate | 2 Hz |
| No. of beams | 4 slanted at 20 degrees |

* Maximum range depends on acoustic scattering conditions and transmit power.

## Bottom velocity measurements for Signature VM 1000 kHz

| | |
|---|---|
| Single ping std @ 3 m/s | 0.5 cm/s |
| Long-term accuracy | ± 0.1% / ± 0.1 cm/s |
| Minimum altitude | 0.2 m |
| Maximum altitude | 30 m |
| Velocity resolution | 0.01 mm/s |
| Maximum sampling rate | 4 Hz |

## Bottom velocity measurements for Signature VM 500 kHz

| | |
|---|---|
| Single ping std @ 3 m/s | 0.5 cm/s |
| Long-term accuracy | ± 0.1% / ± 0.1 cm/s |
| Minimum altitude | 0.3 m |
| Maximum altitude | 70 m |
| Velocity resolution | 0.01 mm/s |
| Maximum sampling rate | 2 Hz |

## Bottom velocity measurements for Signature VM 250 kHz

| | |
|---|---|
| Single ping std @ 3 m/s | TBA |
| Long-term accuracy | TBA |
| Minimum altitude | 5 m |
| Maximum altitude | 205 m |
| Velocity resolution | 0.01 mm/s |
| Maximum sampling rate | 1 Hz |

## Depth measurements for Signature VM 1000 kHz

| | |
|---|---|
| No. of beams | 1 vertical |
| Maximum sampling rate | 2 Hz |
| Max. range | 30 m |
| Vertical resolution / accuracy | 0.001 m / 1% of the measured value** |

** Assuming a constant speed of sound

## Depth measurements for Signature VM 500 kHz

| | |
|---|---|
| No. of beams | 1 vertical |
| Maximum sampling rate | 2 Hz |
| Max. range | 70 m |
| Vertical resolution / accuracy | 0.001 m / 1% of the measured value** |

** Assuming a constant speed of sound

## Depth measurements for Signature VM 250 kHz

| | |
|---|---|
| No. of beams | N/A* |
| Maximum sampling rate | N/A |
| Max. range | N/A |
| Vertical resolution / accuracy | N/A |

* Depth measurement via the 4 slanted beams.

## Echo intensity Signature VM 1000 and 500 kHz

| | |
|---|---|
| Sampling | Same as velocity for slanted beams |
| Resolution | 0.5 dB |
| Dynamic range | 70 dB slanted beams |
| No. of beams | 4 slanted at 25 degrees |
| Beam width | 2.9° |

## Echo intensity Signature VM 250 kHz

| | |
|---|---|
| Sampling | Same as velocity for slanted beams |
| Resolution | 0.5 dB |
| Dynamic range | 70 dB slanted beams |
| No. of beams | 4 slanted at 20 degrees |
| Beam width | 2.3° |

## Echosounder option for Signature VM 1000 kHz

| | |
|---|---|
| No. of beams | 1 vertical |
| Frequency | 1000 kHz; 1000, 500 and 250 kHz selectable channel(s) with MF license |

## Echosounder option for Signature VM 1000 kHz

| | |
|---|---|
| Maximum sampling rate | 2 Hz |
| Max. range | 30 m |
| Resolution | 3 mm - 0.25 m; 5 mm - 0.25 m with MF license |
| Number of bins | 10,000 |
| Transmit pulse length | 16 µs - 0.5 ms, 64 µs - 0.5 ms |
| Transmit pulse | Monochromatic or pulse compressed (1000 kHz, 25% BW); 500 and 250 kHz monochromatic with Multifrequency option |
| Resolution / dynamic range | 0.01 dB / 70 dB |

## Echosounder option for Signature VM 500 kHz

| | |
|---|---|
| No. of beams | 1 vertical |
| Maximum sampling rate | 1 Hz |
| Max. range | 70 m |
| Resolution | 6 mm - 0.5 m |
| Number of bins | 11,000 |
| Transmit pulse length | 32 µs - 1 ms |
| Transmit pulse | Monochromatic or pulse compressed (25% BW) |
| Resolution / dynamic range | 0.01 dB / 70 dB |

## Echosounder option for Signature VM 250 kHz

| | |
|---|---|
| No. of beams | N/A |
| Maximum sampling rate | N/A |
| Max. range | N/A |
| Resolution | N/A |
| Number of bins | N/A |
| Transmit pulse length | N/A |
| Transmit pulse | N/A |
| Resolution / dynamic range | N/A |

## Other, Signature VM ADCP

| | |
|---|---|
| Temperature sensor range /accuracy | -4 °C to 40 °C / 0.1 °C |
| Pressure | Piezoresistive |
| Standard range | 0-300 m (inquire for options) |
| Accuracy/precision | 0.1% FS / better than 0.002% of full scale |
| Compass and tilt | Solid-state magnetometer |
| Data recording | 16 GB (inquire for options) |
| Data cable | 10 m Ethernet cable (inquire for options) |
| IO | Ethernet |
| DC Input | 15–48 V DC |

## Environmental, Signature VM ADCP

| | |
|---|---|
| Operating temperature | -4 °C to 40 °C |
| Storage temperature | -20 °C to 60 °C |
| Vibration | IEC 60068-1/IEC60068-2-64 |
| EMC approval | IEC 61000 |
| Depth rating | 300 m – Bottom track is limited to surface vessels |

## Environmental, Signature VM ADCP

| | |
|---|---|
| Connectors | Straight fitted MCBH6F (Ethernet) |
| Housing | Small instrument housing |
| Material | POM with titanium fasteners and additional, reinforced transducer cups for VM 250 |

## Processing unit

| | |
|---|---|
| Processor/memory | Intel i3/2x 8GB |
| Hard disk | SSD, 500 GB |
| Operating system | Windows® 11 IoT Ent LTSC |
| Housing | Half 19" 2 HE case |
| Dimensions | 265x110x340 mm |
| Input | 24 V DC, 20 W typical. (230\|120 V AC adaptor supplied) |
| Total weight | 5.75 kg |
| Connections | Power, Signature ADCP, AN_GNSS, 2x HDMI, 2xLAN, 3x USB |

## Nortek VM acquisition software

| | |
|---|---|
| Acquisition | Signature VM - binary, AN GNSS compass - binary |
| Timing | < 0.6 s ZDA, IEEE1588/PTP and NTP for absolute timestamping (GNSS compass/Signature VM) |
| Configuration | Signature VM (partly)Advanced Navigation GNSS compass |
| Display | Vessel track in map, Bottom-track velocity, Depth, Speed through water, Velocity magnitude and direction, Echo amplitude, Echo correlation, Vertical depth*, Vertical echogram; corrected relative volume backscatter (1000/500)*, Discharge, Frequency spectrum analyzer |
| Status | Signature VM + AN_GNSS compass |
| Output | Online: NMEA and binary data formats (Hypack, Qinsy, Displays). Offline: CSV, ASCII VMT, MATLAB, MATLAB VMT, MATLAB QRev, KML |

* Signature1000 and 500

## GNSS compass

| | |
|---|---|
| Brand and model | Advanced navigation GNSS compass v2 |
| Position accuracy (with RTK) | Horizontal: 0.01 m, Vertical: 0.015 m |
| Heading accuracy | 0.2° |
| Supported navigation systems | GPS L1_L2, GLONASS G1_G2, GALILEO E1_E5b, BeiDou B1_B2 |
| Heave accuracy | 0.05 m |
| Communication | Ethernet 10/100 |
| Timing | PTP, NTP timeserver functionality |
| Protocol | NMEA 0183, AN Packet Protocol, TSS1 Simrad, RTCM |

## AHRS option

| | |
|---|---|
| Accelerometer dynamic range | ± 2 g |
| Gyro dynamic range | ± 250°/sec |
| Magnetometer dynamic range | ± 1.3 Gauss |
| Pitch and roll range / resolution | ± 90° (pitch), ± 180° (roll)/0.01° |
| Pitch and roll accuracy | ± 2° (dynamic)3), ± 0.5° (static, ± 30°) |
| Heading range / resolution | 360°, all axes /0.01° |

| AHRS option | |
|---|---|
| Heading accuracy | ± 3° (dynamic)3), ± 2° (static, tilt < 20°) |
| Sampling rate | Same as measurement rate |